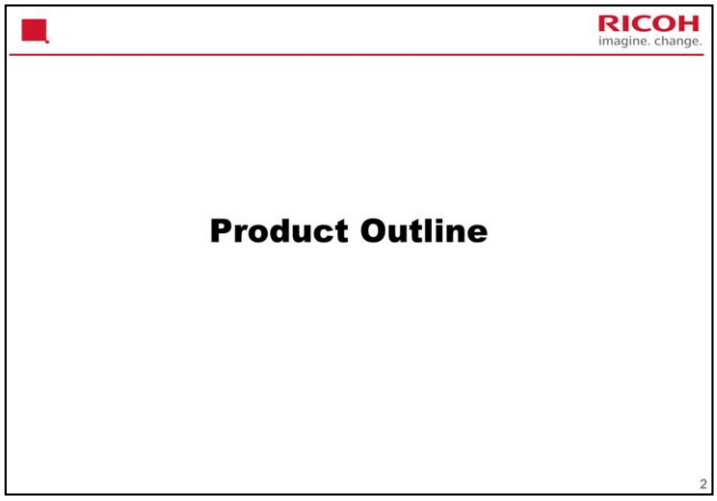
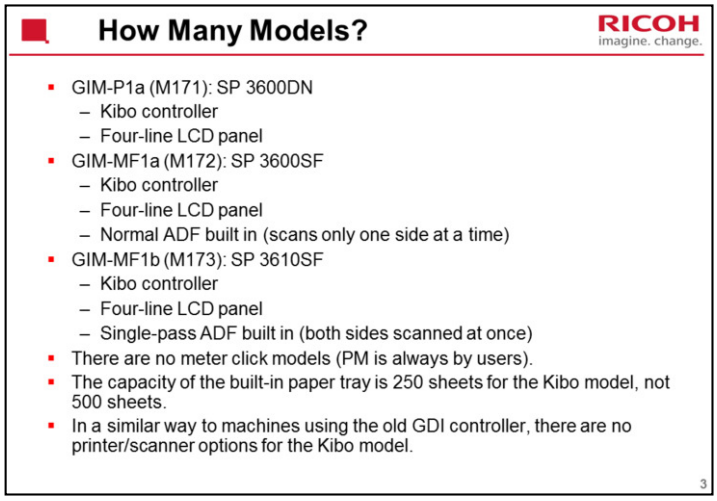
This course teaches about how to service this new series of black-and-white printers and copiers.

This is very similar to the previous models in the Gim-MF1/P1 series. The main difference is that these new models have the Kibo controller, whereas the previous models have a GW+ controller.

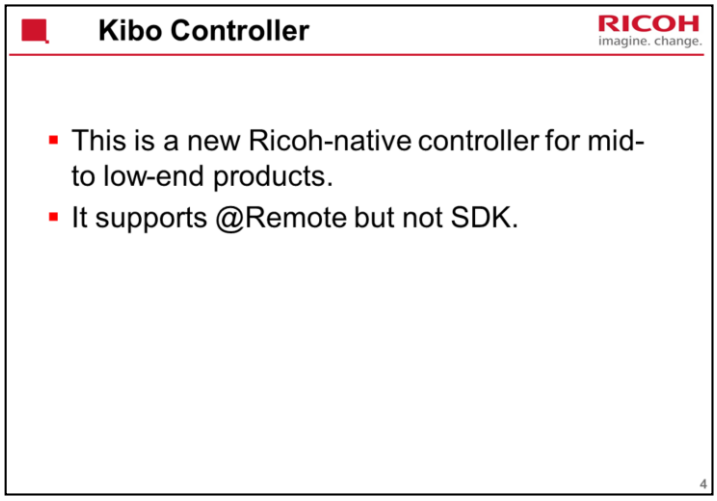
Sometimes, these two different sets of models will be referred to as the ‘Kibo model’ and the ‘GW model’.



No additional notes



There is a PM table in the service manual. The parts in this table should be thought of as yield parts, and only to be replaced if the machine is used more than its expected average volume.



No additional notes

Appearance: GIM-MF1a/b

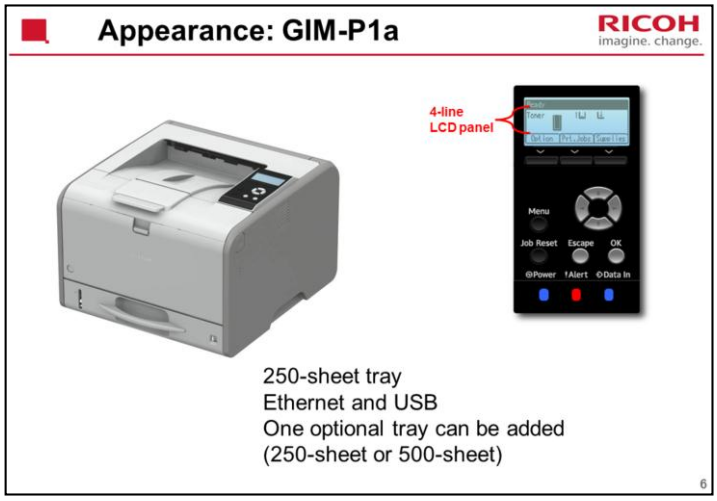
RICOH
imagine. change.

MF1a: Built-in ADF
MF1b: Built-in single-pass ADF

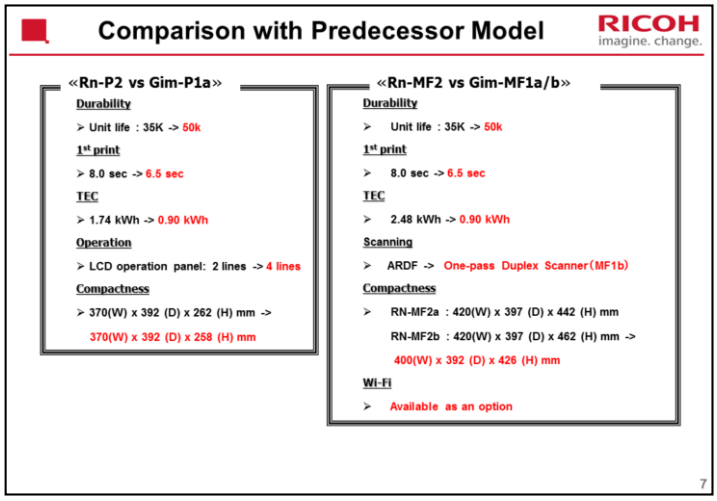
250-sheet tray
Ethernet and USB
One optional tray can be added
(250-sheet or 500-sheet)

5

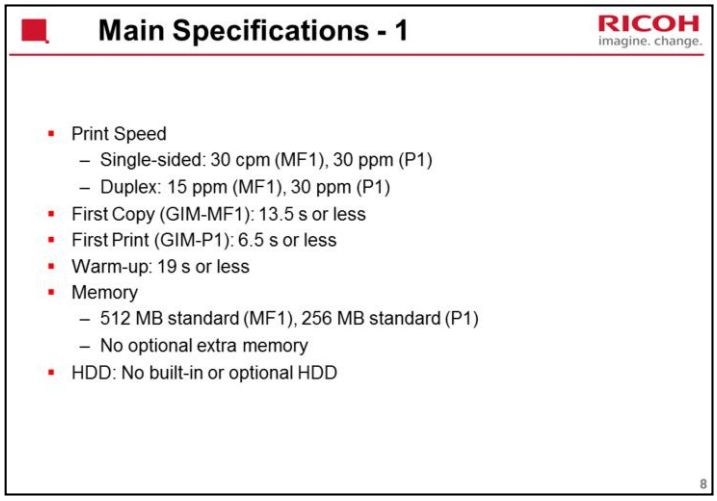
The operation panels are different from the GW versions.



No additional notes



No additional notes



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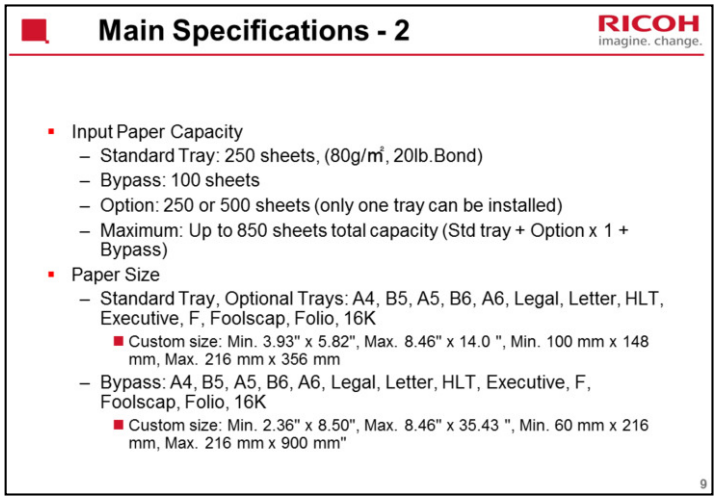
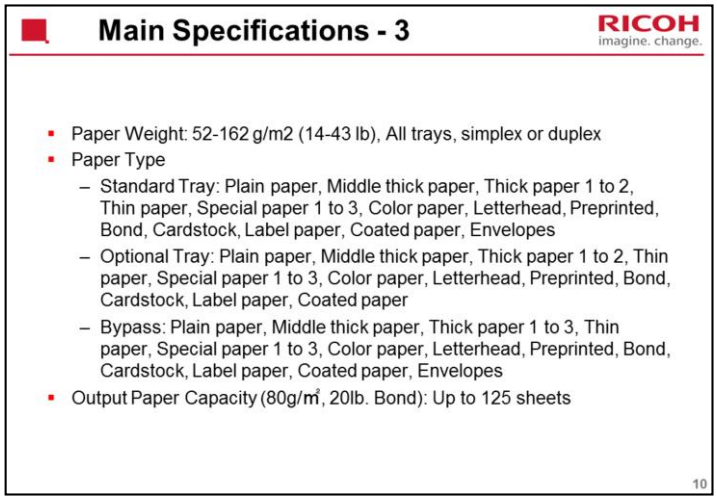


Note that the capacity of the standard tray is 250 sheets (for the GW version, it is 500 sheets).



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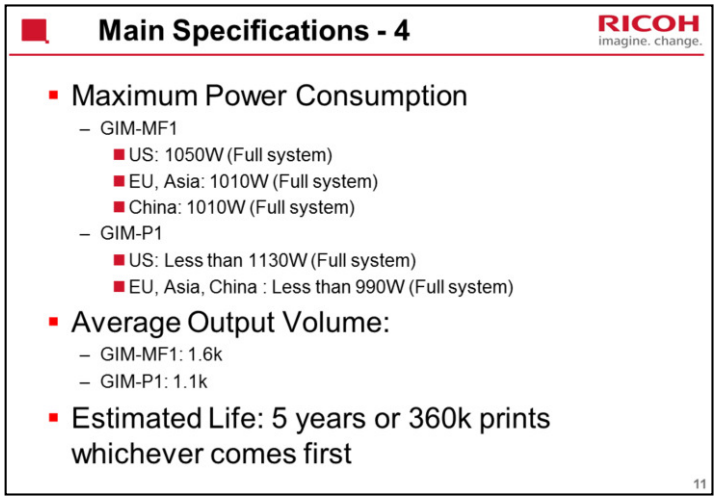

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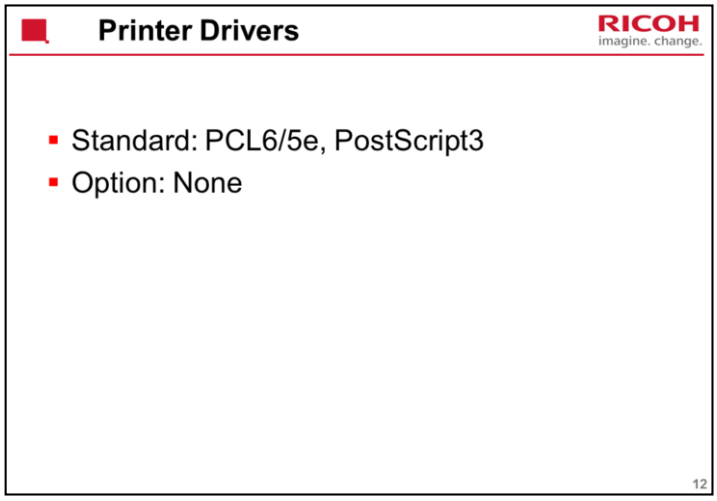
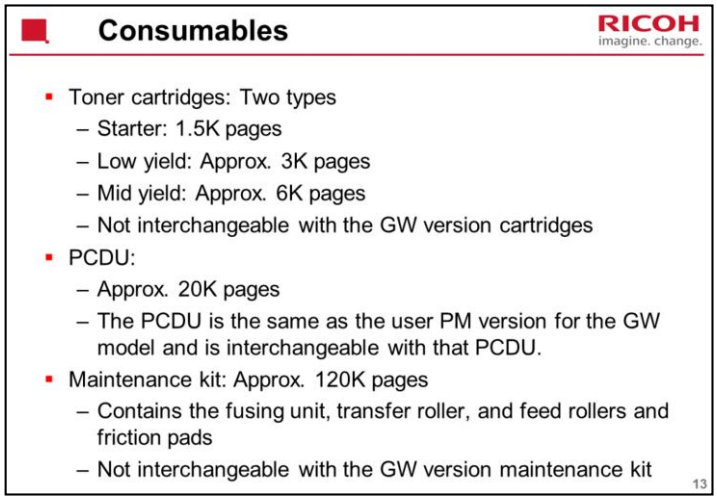
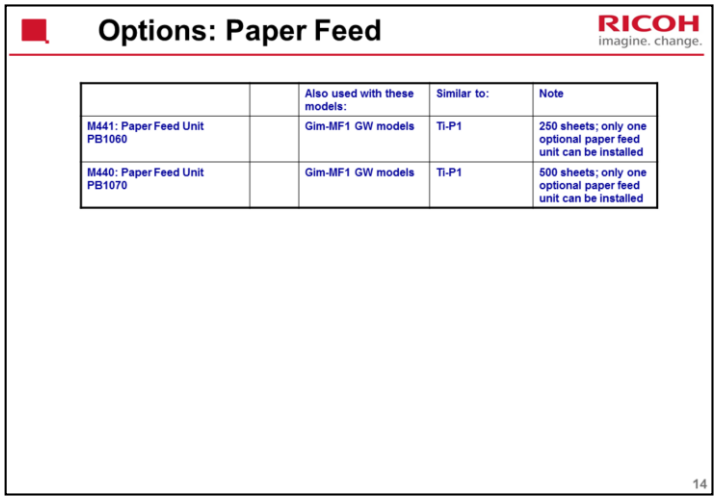


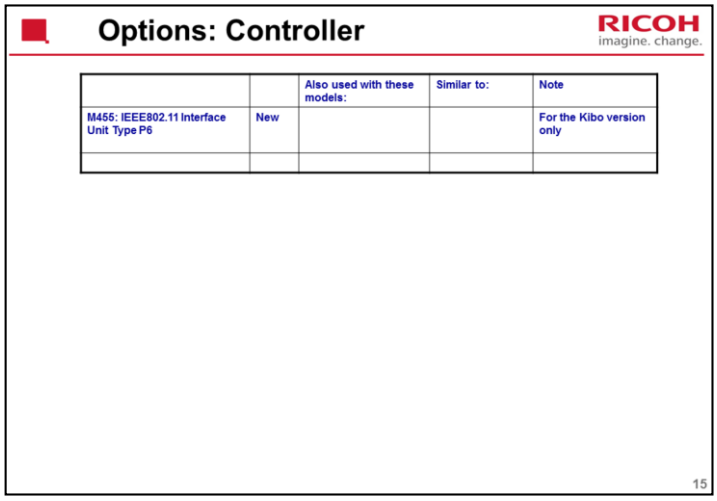
No additional notes



Toner yield is measured at standard temperature and humidity. The yield may change depending on the circumstances and printing conditions.



No additional notes



No additional notes

Component Layout

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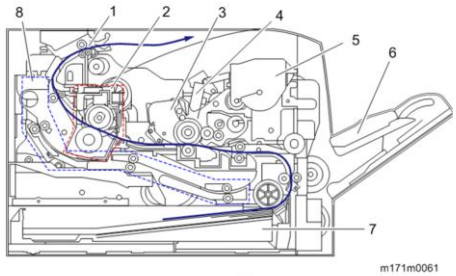


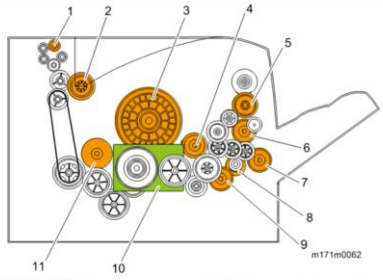
1. Exit / Switchback unit
2. Fusing unit
3. PCDU
4. LED head
5. Toner cartridge
6. By-pass feed tray
7. Paper feed unit
8. Duplex paper path

16

This slide shows the major components. Details will be covered later.
The paper exit area is different from the GW versions of this model.

Drive Layout

RICOH
imagine. change.



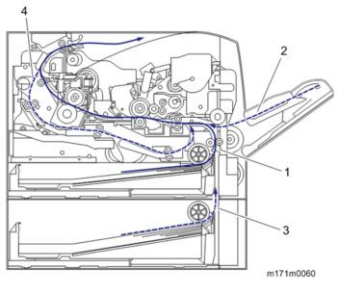
1. Exit/switchback gear
2. Fusing drive gear
3. Drum gear
4. Registration clutch
5. Toner supply clutch
6. By-pass feed clutch
7. By-pass bottom plate clutch
8. Relay clutch
9. Paper feed clutch
10. Main motor
11. Duplex clutch

17

No additional notes

Paper Path

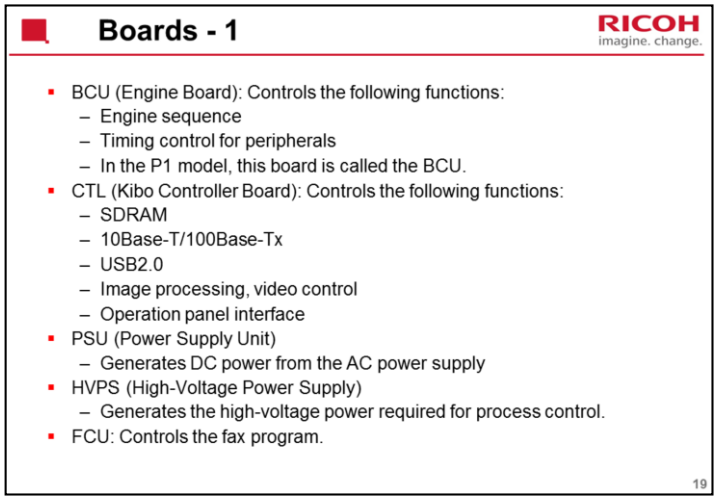
RICOH
imagine. change.



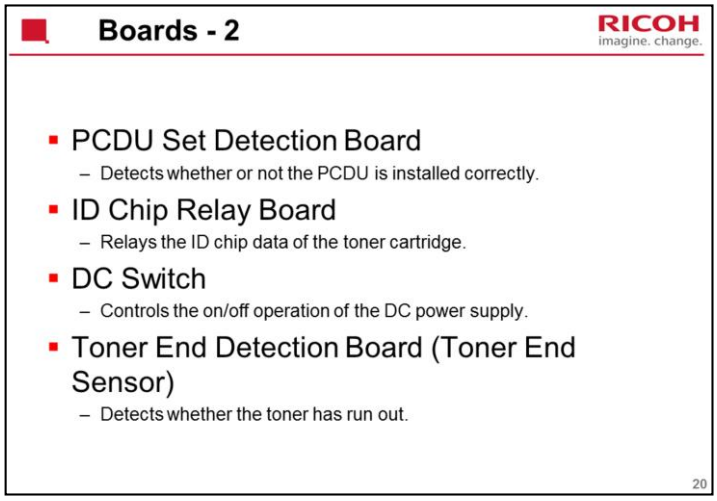
1. Main paper feed path
2. By-pass paper feed path
3. Optional tray paper feed path
4. Duplex paper feed path

18

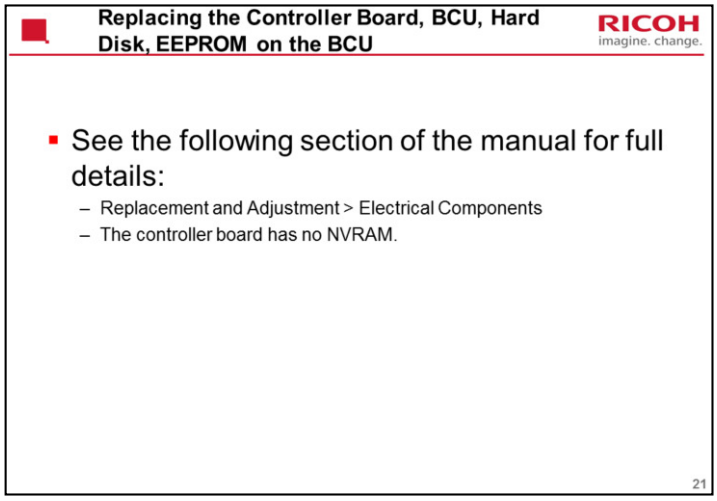
No additional notes



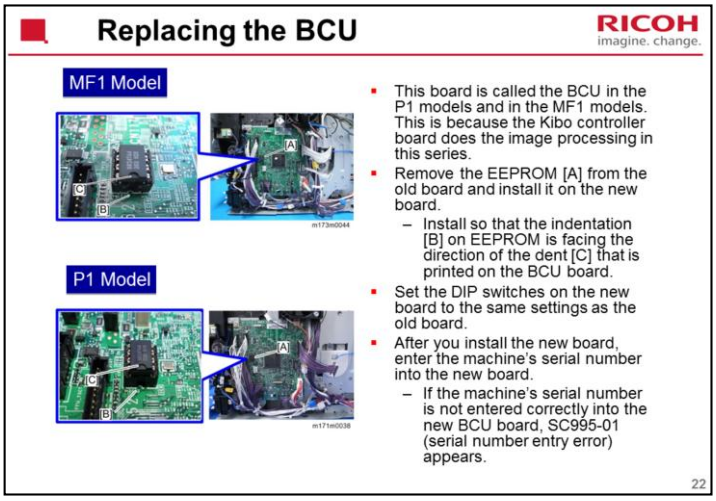
No additional notes



No additional notes



ESA: This is sometimes called SDK



No additional notes

Caution Before Removing Components

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- Even if you turn the power switch off, +5V is still supplied. So do the following before you start work.
  1. Push the power switch [A] on the machine.
  2. Wait 3 minutes to shut down.
  3. Take out the power cord.
  4. Do either of the following:
     - Wait several minutes
     - Push the power switch [A] again to remove the residual charge.

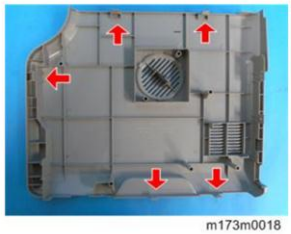
23

No additional notes

Covers

RICOH
imagine. change.

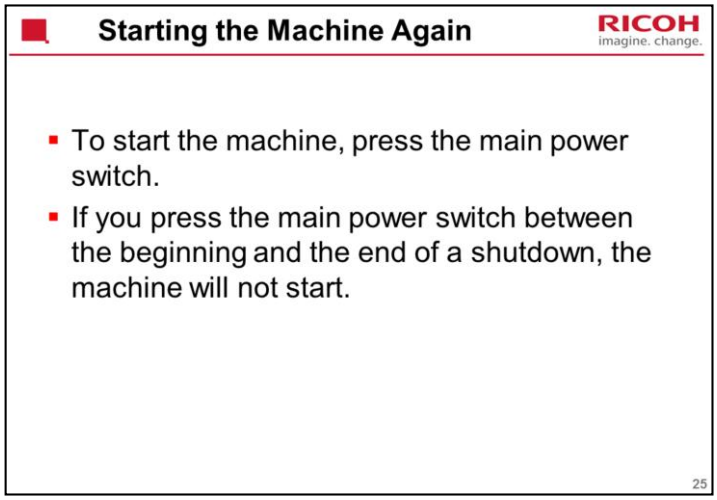
- To improve the appearance of the machine, screw holes are mostly not visible. This means that the covers are held in place by a lot of tabs.
- The locations of these tabs are explained in the removal procedures. Pay attention to these diagrams, so that you do not damage the tabs.
  - Example: Left cover



m173m0018

24

No additional notes



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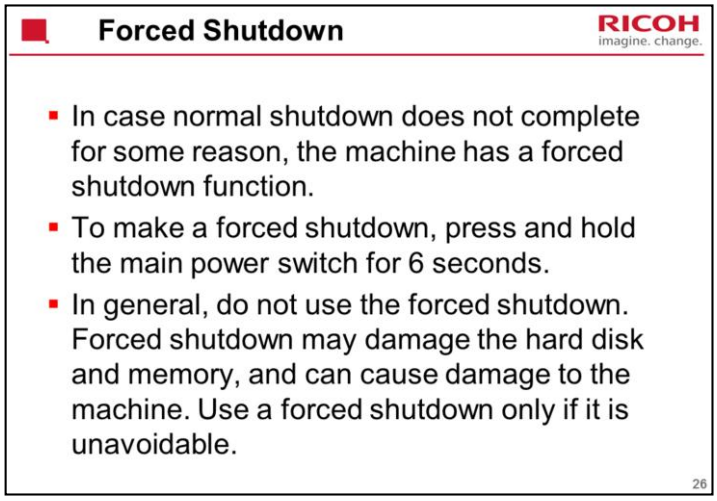
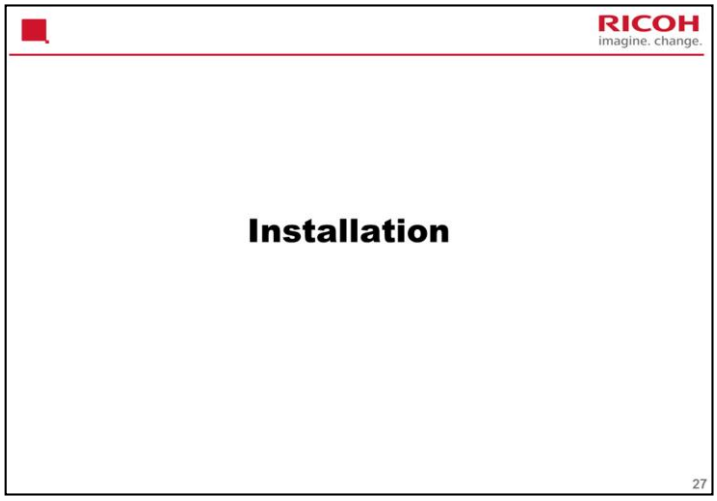
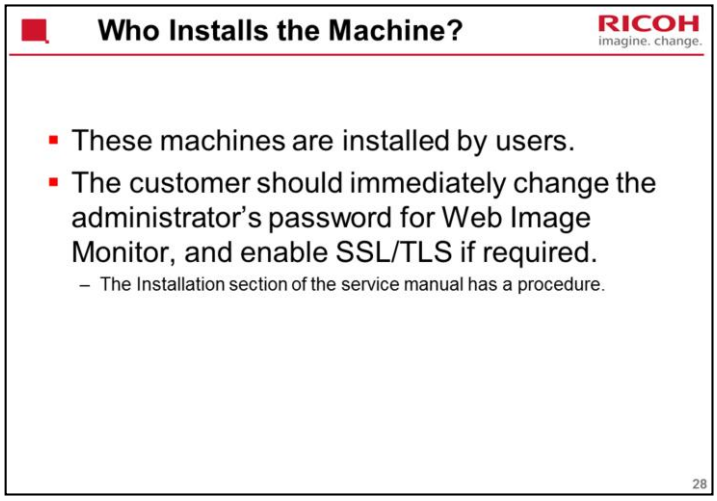


No additional notes



No additional notes



No additional notes

Optional Paper Tray Units

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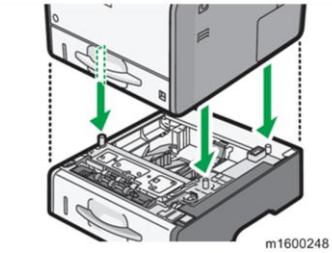
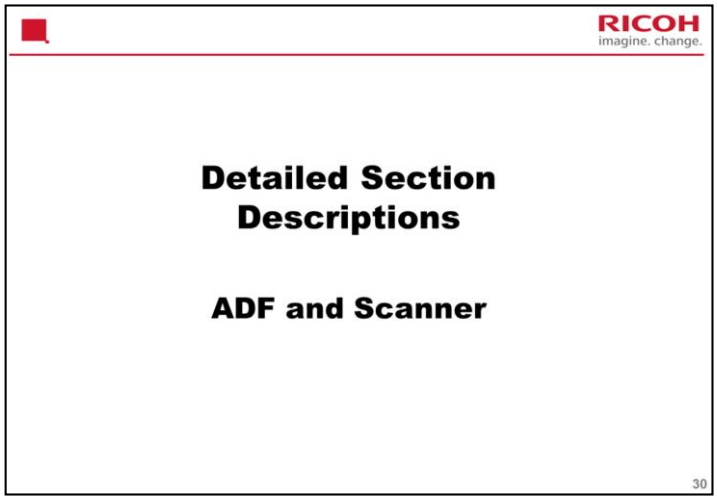


- To attach two one-tray units at the same time, first stack them one on top of the other, and then attach them as a single unit to the machine.

29

No additional notes



These are different from the GW version, and are not produced by Ricoh.

ADF and Scanner

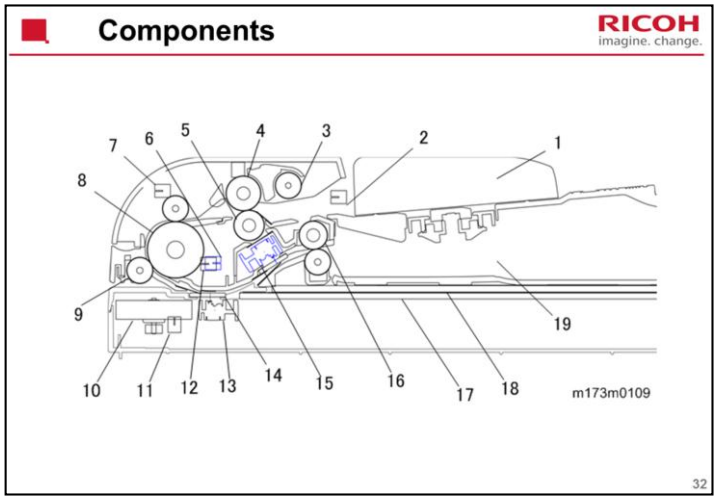
RICOH
imagine. change.

- These are not produced by Ricoh, so there are only brief descriptions of how they work.
- The ADF can be disassembled, but do not attempt to disassemble the scanner in the field.
  - You can remove the scanner as a complete unit. Disconnect the operation panel cable from the hook before you lift the scanner off the machine.

m173m0073

31

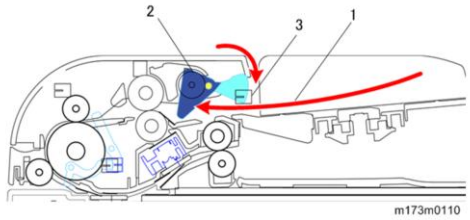
No additional notes



1. Original tray
2. Original set sensor
3. Pick-up roller
4. Paper feed roller
5. Separation roller
6. Scan sensor (M173 only)
7. Paper feed cover open/closed sensor
8. Transport roller
9. Pre-scanning roller
10. Scanner motor
11. Scanner HP sensor
12. Leading edge sensor
13. CIS 1
14. ADF exposure glass
15. CIS 2 (M173 only)
16. Exit roller
17. Exposure glass
18. Platen
19. Original exit tray

Original Detection

RICOH
imagine. change.



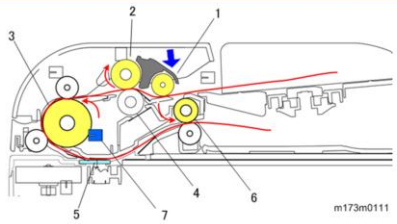
- When an original [1] is placed in the feeder, it pushes the feeler [2], and the actuator enters the sensor [3].

33

No additional notes

Original Feed (Single-sided Scan)

RICOH
imagine. change.



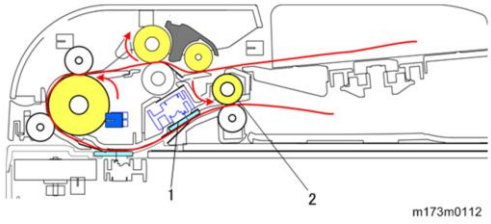
- When the [Start] key is pressed, the pick-up roller [1] drops onto the top original of the stack. The original is fed from the paper feed roller [2] to the transport roller [3].
- The separation roller [4] ensures that only one sheet of the original enters the feeder.
- The original is fed by the transport roller [3], scanned on the ADF exposure glass [5], and then delivered by the exit roller [6].
- Original feed is detected by the leading edge sensor [7]. If an error occurs, it is reported as a paper jam.

34

No additional notes

Original Feed (Duplex Scan)

RICOH
imagine. change.



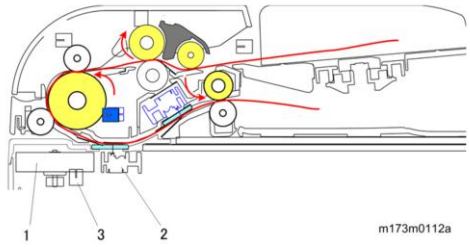
- The CIS [1] scans the other side of the paper.
  - This is CIS 2 in the component layout diagram.
  - CIS 1 is in the scanner.

35

No additional notes

Scanner Drive

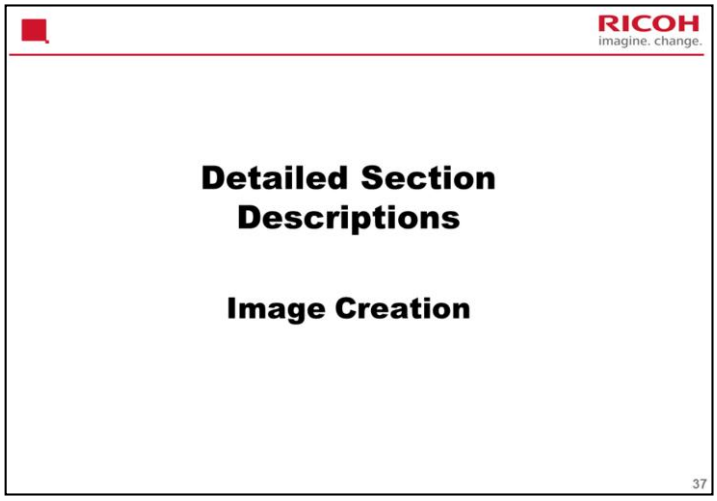
RICOH
imagine. change.



- The scanner motor [1] drives the carriage which contains CIS 1 [2] through a belt.
- After scanning, the carriage returns to the scanner HP sensor [3].
- The actuator for the scanner HP sensor is on the underside of the ADF exposure glass.

36

No additional notes



This section explains how a latent image is written on the drum.

The method is the same as the Ti-P1 (M109) and the GW version of the Gim-MF1/P1.

Overview

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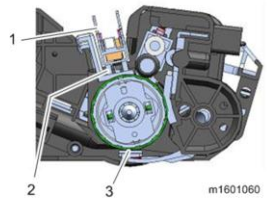
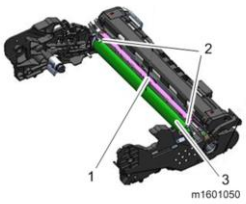




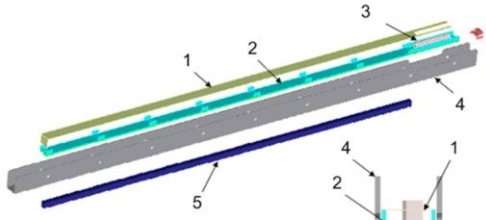
- An LED array [1] writes the latent image on the OPC [3].
- A spacer [2] on the drum keeps the LED array at the correct distance from the OPC for correct focus.
- The LED writing method contributes to machine downsizing, and is superior to the LD writing method in image quality, noise reduction, and energy saving.

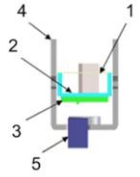
38

No additional notes

Components of the LED Array

RICOH
imagine. change.





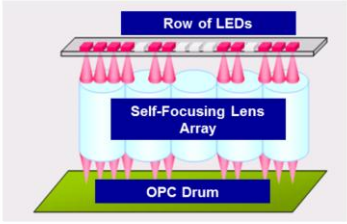
- The LED array consists of the following parts.
  1. Sheet
  2. Base
  3. LED board
  4. Frame
  5. SLA (Self-focusing Lens Array)
- The LED array is replaced as one complete unit. The individual components shown above cannot be replaced in the field.

39

No additional notes

Detailed Structure of the LED Array

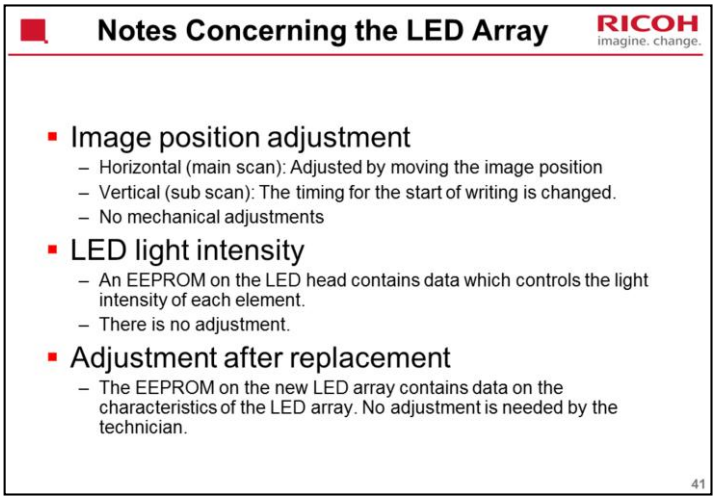
RICOH
imagine. change.



- Tiny LEDs capable of creating images at 1200 dpi are arranged in a line. Light beams emitted by the LEDs are focused using the Self-focusing Lens Array (SLA), creating an image on the OPC drum.
- Each LED head has 26 LED chips on board, and each chip has a line of LEDs 8mm in length.
- If a vertical line 8mm in width appears on the image parallel to the direction of paper feed, it may be caused by a broken LED chip.

40

No additional notes



No additional notes

Moving the Image Position

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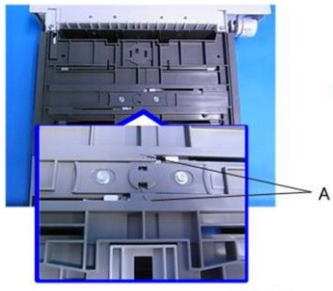
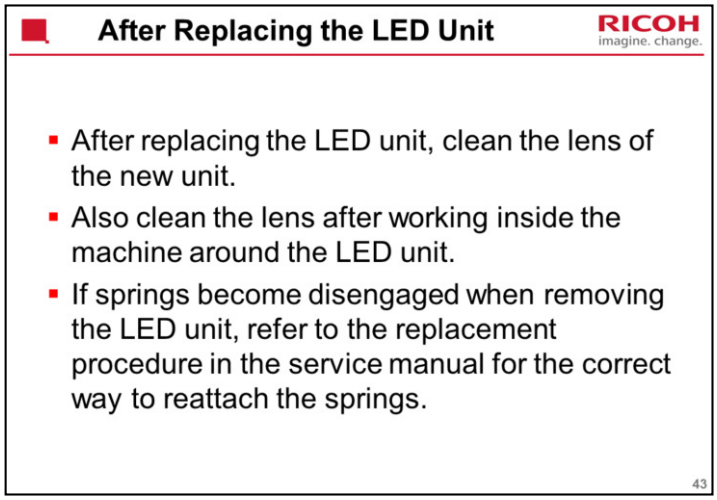


m1601016

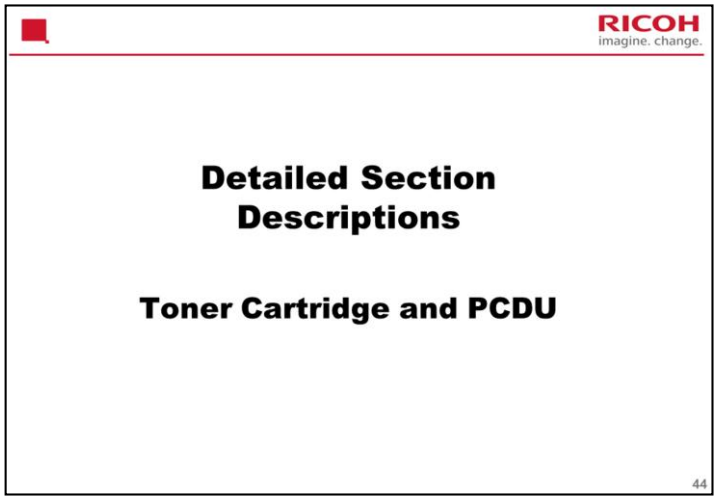
- Loosen the screws on the bottom of the tray, and then move the holder to the right or the left (maximum adjustment: 2mm).
- When at the default (±0) position, the holder is at the location marked by a triangle [A].

42

No additional notes



No additional notes



This section explains the components of the toner cartridge and the PCDU.

The method is the same as the Ti-P1 (M109) and the GW version of the Gim-MF1/P1.

Removing the Toner Cartridge and PCDU

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imagine. change.

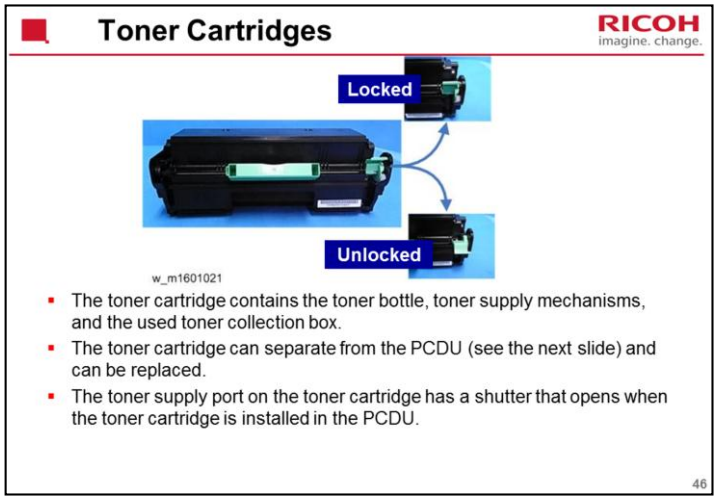
m1600207

m1600216

- Open the front cover.
- To take out both PCDU and toner cartridge, pull the green handle.
- To take out only the toner cartridge, push the green button on the right and pull the green handle.

45

No additional notes



No additional notes

Toner Cartridge Release Lever

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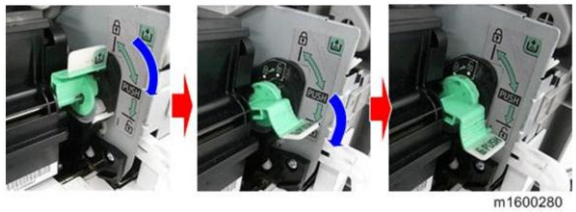
imagine. change.



m1600280

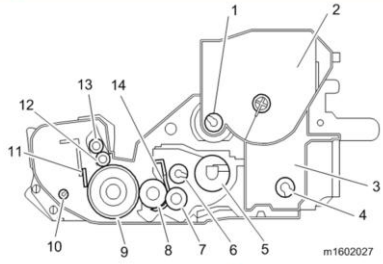
- This lever releases the toner cartridge from the PCDU.
- The lever works in two steps. First, push the lever down to the horizontal position. Then stop there, then push the lever down to release the cartridge.

47

No additional notes

Toner Cartridge/PCDU Assembly Components

RICOH
imagine. change.



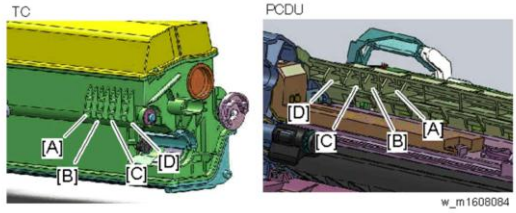
1. Toner Supply Coil
2. Toner Box
3. Used Toner Collection Box
4. Used Toner Transport Coil
5. 1st Mixing Coil
6. 2nd Mixing Coil
7. Toner Supply Roller
8. Development Roller
9. OPC
10. Waste Toner Collection Coil
11. OPC Cleaning Blade
12. Charge Roller
13. Charge Cleaning Roller
14. Development Blade

48

No additional notes

Two Types of Cartridge

RICOH
imagine. change.



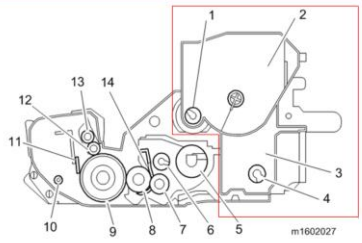
- There are two types of cartridge: 3,000 or 6,000 pages (ISO)
- The protrusions [A to D] on the cartridges are different. If you try to put the wrong type of cartridge in the machine, you will find that the toner cartridge does not fit properly into the PCDU on one side, preventing the front cover from closing.
  - Just in case somebody manages to defeat this mechanism, the machine also has a function to use the data from the ID chip to detect incompatibility.

49

The toner cartridge (TC in the diagram) is different from the GW version of this model.

Toner Cartridge

RICOH
imagine. change.



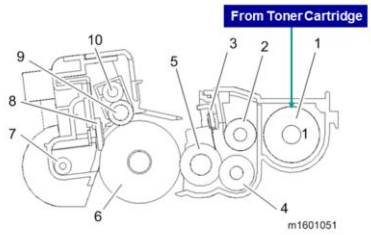
- The toner cartridge contains the toner box [2], toner supply coil [1], and the used toner collection box [3].
- The toner supply port shutter in the cartridge opens when the toner cartridge is installed in the PCDU.

50

No additional notes

Toner Supply Mechanism

RICOH
imagine. change.



- When the toner supply clutch turns on, a coil in the toner cartridge rotates to transfer toner to the cartridge exit and then the PCDU. Toner which falls into the PCDU is transferred to the development section by the 1st mixing coil [1].

51

No additional notes

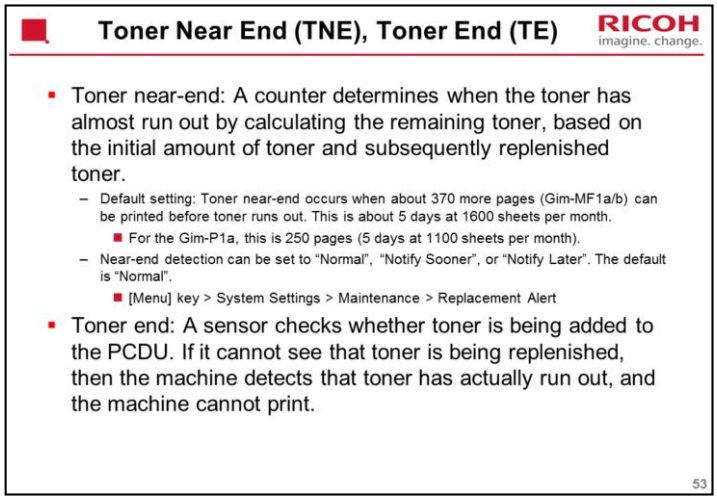
ID Chip

RICOH
imagine. change.

- Each toner cartridge has an ID chip that contains information such as product information and the number of prints.
- This ID chip also informs the machine when the cartridge is a new one.

52

No additional notes



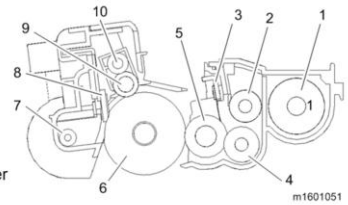
Approximate number of prints that can be made with each setting:

In accordance with ISO/IEC19752 and A4 paper and with the print density set to the initial factory setting

PCDU Layout

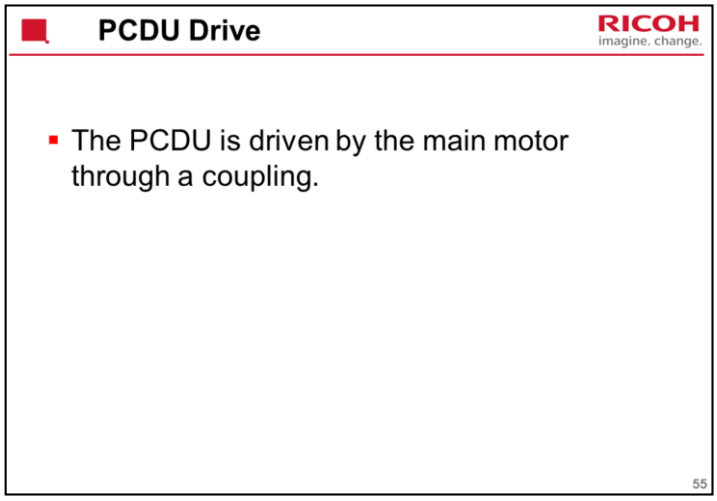
RICOH
imagine. change.

- The PCDU contains the charge roller, photoconductor, development mechanism, and cleaning unit.
  1. 1st Mixing Coil
  2. 2nd Mixing Coil
  3. Development Blade
  4. Toner Supply Roller
  5. Development Roller
  6. OPC
  7. Waste Toner Collection Coil
  8. OPC Cleaning Blade
  9. Charge Roller
  10. Charge Roller Cleaning Roller



54

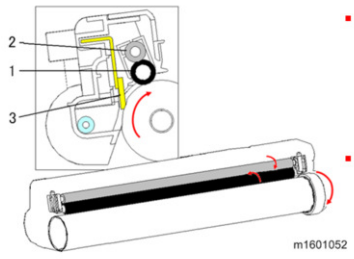
No additional notes



No additional notes

Drum Charge and Cleaning

RICOH
imagine. change.



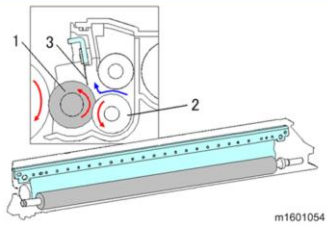
- The charge roller [1] gives the drum surface a uniform negative charge.
  - The charge roller [1] rotates in the same direction as the OPC drum.
- If the charge roller [1] is dirty, the applied electric charge becomes uneven. Therefore, the charge roller is always in contact with the cleaning roller [2].
- The OPC cleaning blade [3] removes waste toner from the OPC.

56

No additional notes

Development

RICOH
imagine. change.



m1601054

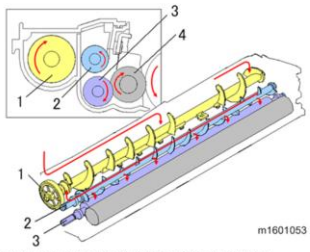
- The development mechanism contains the development roller [1], the toner supply roller [2], and the development blade [3].
- The toner supply roller [2] provides the development roller [1] with toner.
- The development blade [3] keeps the toner attached to the development roller [1] at an even thickness.

57

No additional notes

Mixing

RICOH
imagine. change.



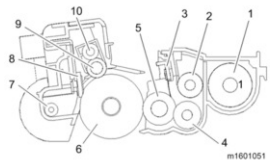
- The toner moves as shown in the above drawing.
- The 1st mixing coil [1] moves the toner to the left side.
- The 2nd mixing coil [2] moves toner to the right side.
- Finally, the toner supply roller [3] supplies toner to the development roller [4].

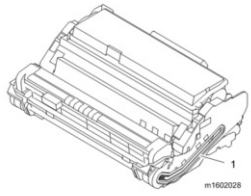
58

No additional notes

Waste Toner Collection

RICOH
imagine. change.





- Toner waste is collected by the waste toner collection coil [7 in the diagram on the left] and sent down to the waste toner bottle.
- The waste toner goes down the path shown by [1] in the diagram on the right

59

The waste toner collection mechanism will be explained in more detail later.

New PCDU Detection

RICOH
imagine. change.

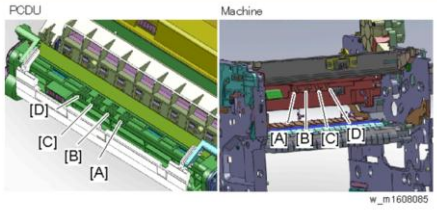
- When a PCDU is placed in the machine, the ID chip [A] is read.
  In this way, the machine detects when a new PCDU is inserted.

60

This is different from the Ti-P1.

Cannot Install the Wrong PCDU

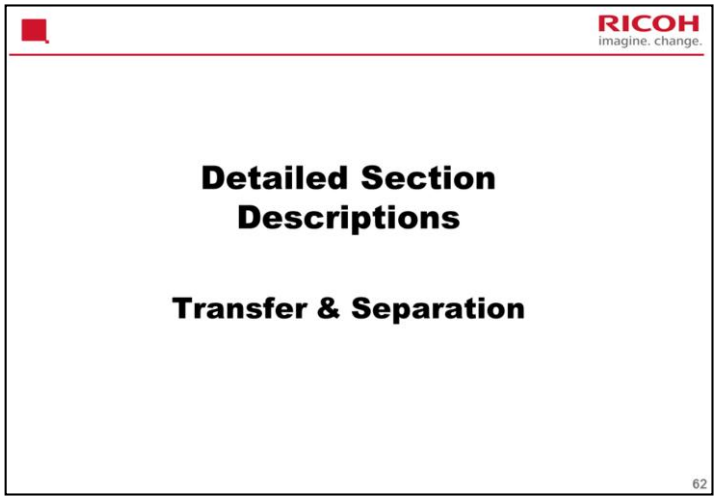
RICOH
imagine. change.



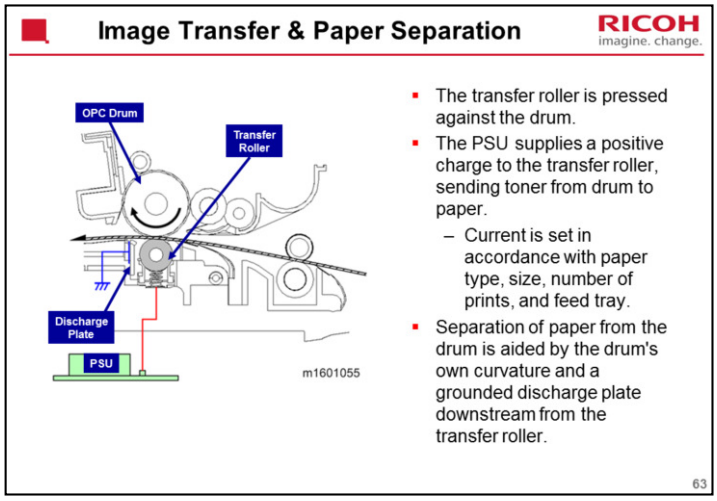
- The PCDU is the same as the user PM version for the GW model.
- The protrusions [A to D] on the PCDUs are different for each model. If you try to put the wrong type of PCDU in the machine, you will find that the PCDU does not fit in properly.
  - Just in case somebody manages to defeat this mechanism, the machine also has a function to use the data from the ID chip to detect incompatibility.

61

No additional notes



This is similar to the Rn-MF1 series, and similar to the GW version of the Gim-MF1/P1.



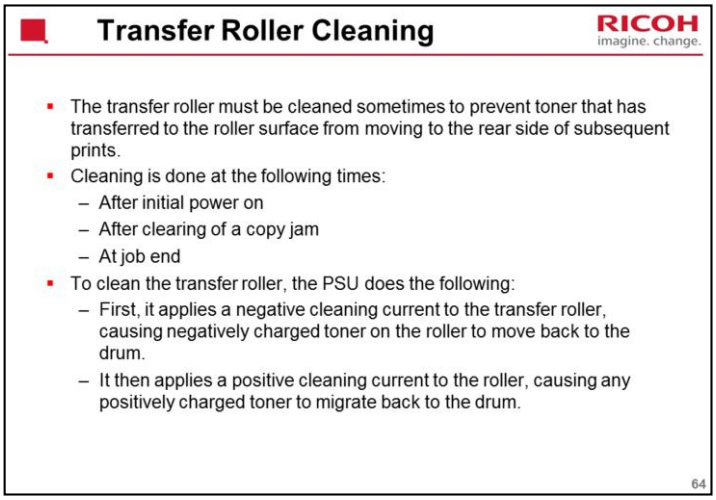
OPC – Organic Photo-Conductor (drum)

PSU – Power Supply Unit

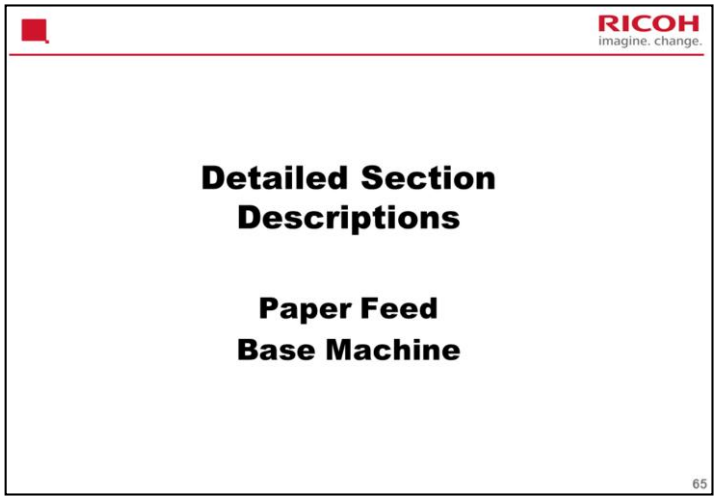
You can adjust the transfer current applied for various situations (SP2-301 T bias control).

Increasing a transfer current level may produce ghost images–some part of image near the leading edge reappears in other part of the page.

Increasing a transfer current level might damage the OPC drum.



No additional notes

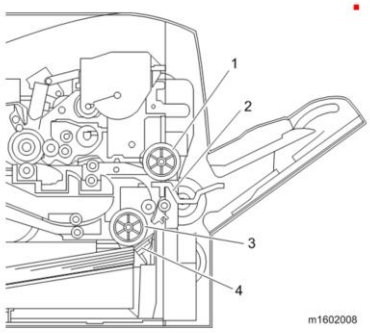


This section explains how paper is fed through the machine.

The method is the same as the Ti-P1 (M109), and the GW version of the Gim-MF1/P1.

Overview

RICOH
imagine. change.



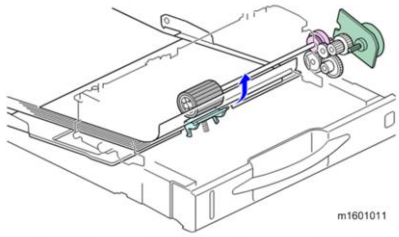
- The machine has a paper tray and a bypass tray.
  1. Bypass Feed Roller
  2. Bypass Friction Pad
  3. Tray 1 Paper Feed Roller
  4. Tray 1 Friction Pad

66

No additional notes

Drive

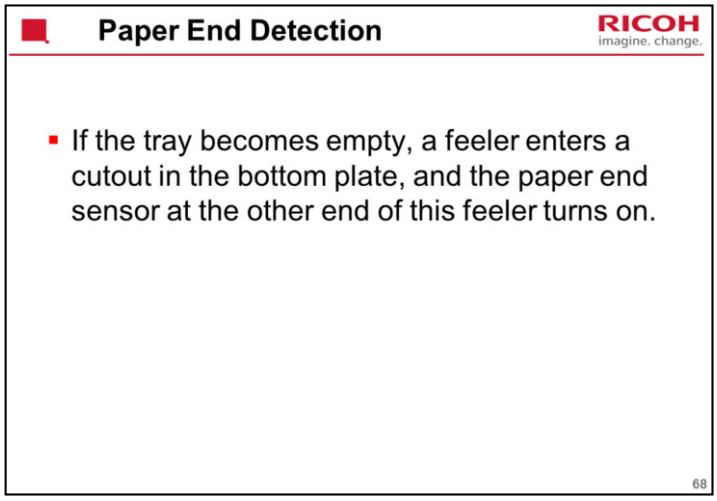
RICOH
imagine. change.



- To start paper feed, the machine turns on the paper feed clutch, and the paper feed roller rotates.
- The friction pad ensures that only the top sheet is fed.
- When the paper activates the registration sensor, the paper feed clutch turns off.
- When the toner image on the transfer belt is at the correct position, the registration clutch turns on to feed the paper to the image transfer unit.

67

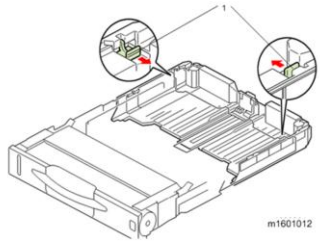
No additional notes



No additional notes

Adjustable Cassette

RICOH
imagine. change.



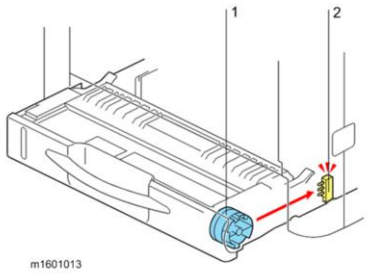
- When shipped from the factory, sizes up to A4 SEF can be loaded in the cassette.
- To support paper sizes larger than A4 SEF, unlock the tray extension lock ([1] in the diagram) to extend the tray.

69

No additional notes

Paper Size Detection

RICOH
imagine. change.



m1601013

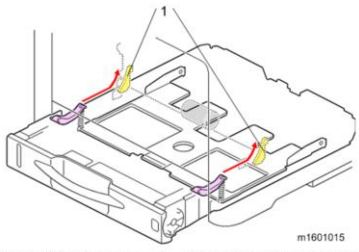
- The paper size switch [2] detects actuators attached to the paper size dial [1].
- The customer must select the correct paper size with this dial.

70

No additional notes

Bottom Plate Lift

RICOH
imagine. change.



- When you slide the paper feed tray into the unit, the bottom plate arm [1] slides along the sloping guide of the main frame, and then the bottom plate is pushed upward by the spring.
- As a result, the lifted bottom plate presses the sheet on the top of the stack up against the paper feed roller.

71

No additional notes

Bypass Feed Bottom Plate Mechanism

RICOH
imagine. change.

- The bottom plate has an automatic lifting system.
  - When paper is loaded into the tray, the end sensor turns on. When the sensor is on, the bottom plate goes down.
    - When it is off, the bottom plate goes up.
  - To start paper feed, the bottom plate moves up (see the next slide).
- When the main motor rotates in reverse, a one-way clutch transfers the drive to the bottom plate lifting system of the bypass tray.
- Then, a cam (on the left as you face the machine) starts rotating to lift the bottom plate up and down.
- The bottom plate position sensor detects up/down movement of the bottom plate by detecting a sensor actuator on the left side of the cam.
  - Sensor ON: Bottom plate is down
  - Sensor OFF: Bottom plate is rising

72

No additional notes

Bypass Feed

RICOH
imagine. change.

- Bypass feed uses a feed roller and friction pad mechanism.
- To start feed, the bottom plate goes up, then the bypass feed clutch starts.
- When the leading edge of the paper is out of the tray, the duplex exit clutch turns on to feed the paper into the machine along the same path as paper from the standard tray.
- The bypass feed clutch turns off when the paper activates the registration sensor.

73

No additional notes

Side-to-side Registration Adjustment
Built-in Paper Tray

RICOH
imagine. change.

m1601059

- To adjust side-to-side registration, loosen the two screws on the underside of the tray and move the rack and pinion mechanism of the side guides from side to side.

74

No additional notes

Side-to-side Registration Adjustment
Bypass Tray

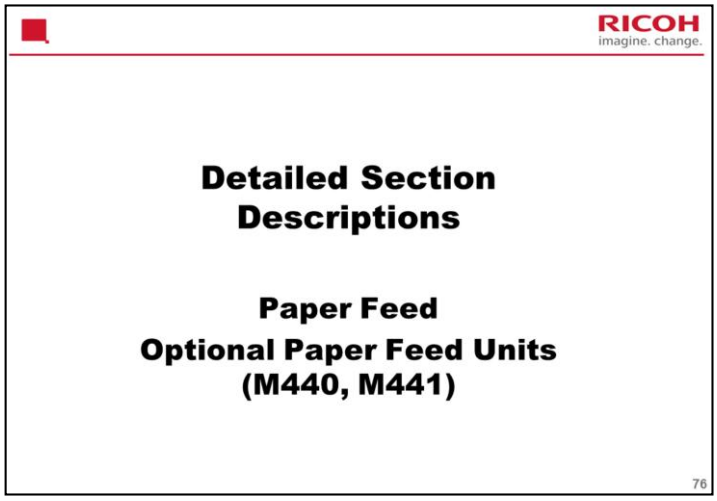
RICOH
imagine. change.

m1601058

- To adjust side-to-side registration, loosen the screw at the right side of the tray and move the bypass bottom plate and side guides from side to side.

75

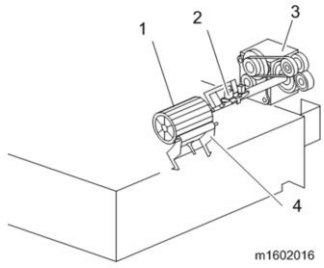
No additional notes



No additional notes

Feed Mechanism

RICOH
imagine. change.



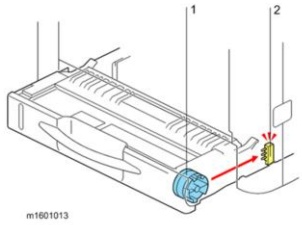
- Feed roller and friction pad
  1. Paper feed roller
  2. Paper feed sensor
  3. Paper feed motor
  4. Friction pad

77

No additional notes

Paper Size Detection

RICOH
imagine. change.



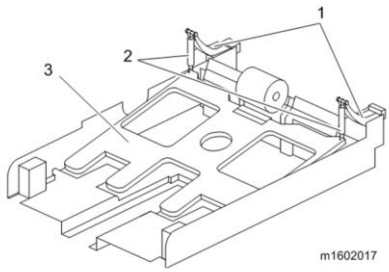
- Paper size is detected by a combination of three detection switches [2].
- The switches are operated by the dial [1] on the right side of the paper feed tray.

78

No additional notes

Lift

RICOH
imagine. change.



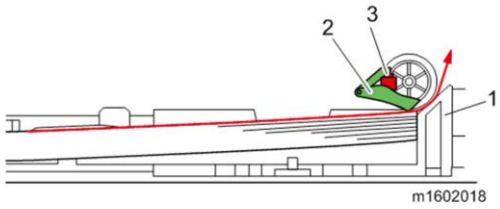
- When you push in the paper cassette, the tray arms (1) rise along the groove in the tilted guide and lift the bottom plate (3) using springs (2).

79

No additional notes

Paper End Detection

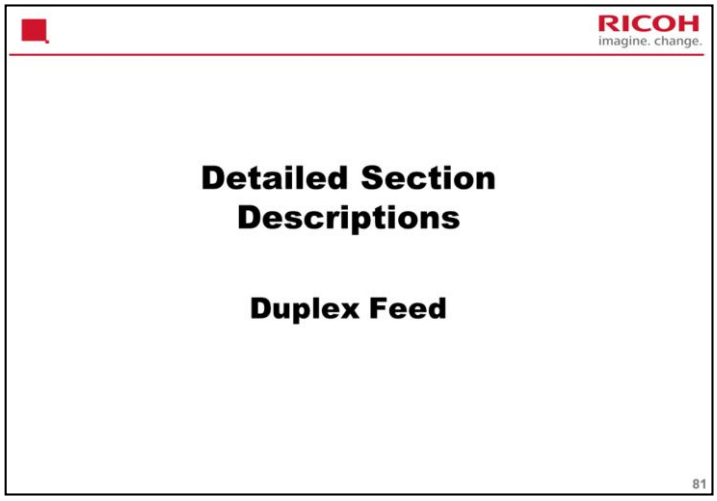
RICOH
imagine. change.



- When paper is all finished, the feeler (2) falls through an opening in the bottom plate and the paper end sensor (3) detects paper end.

80

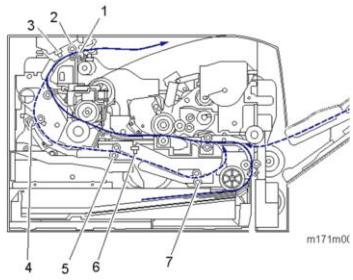
No additional notes



This is a bit different from the GW version of this model.

Components

RICOH
imagine. change.



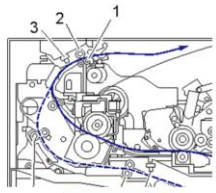
1. Paper Exit Roller
2. Exit / Switchback Roller
3. Exit / Switchback Sensor
4. Duplex Entrance Roller
5. Duplex Relay Roller
6. Duplex Entrance Sensor
7. Duplex Exit Sensor

82

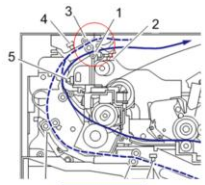
No additional notes

Comparing with GW Models

RICOH
imagine. change.



Kibo Model

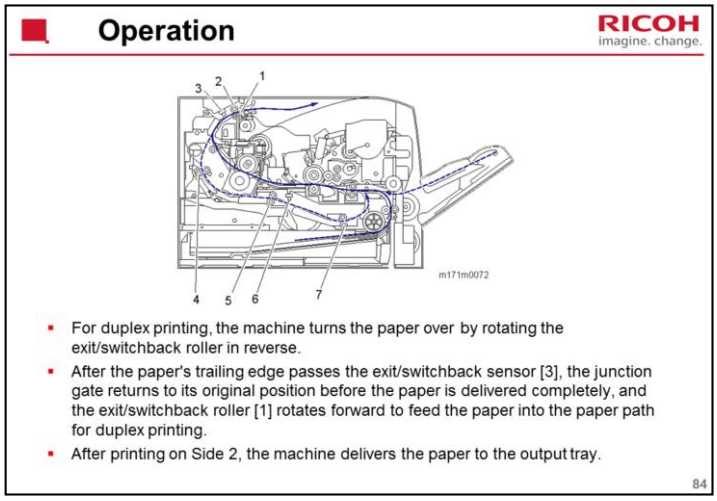


GW Model

- One roller was removed, and the exit mechanism simplified.
- In addition, the paper overflow sensor was removed.

83

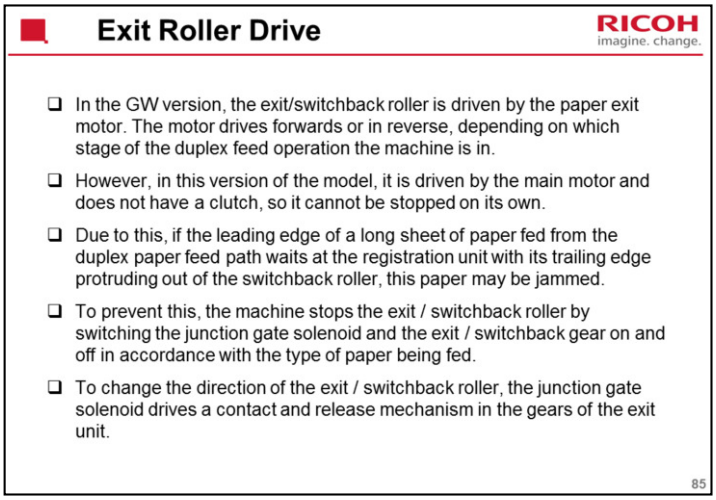
No additional notes



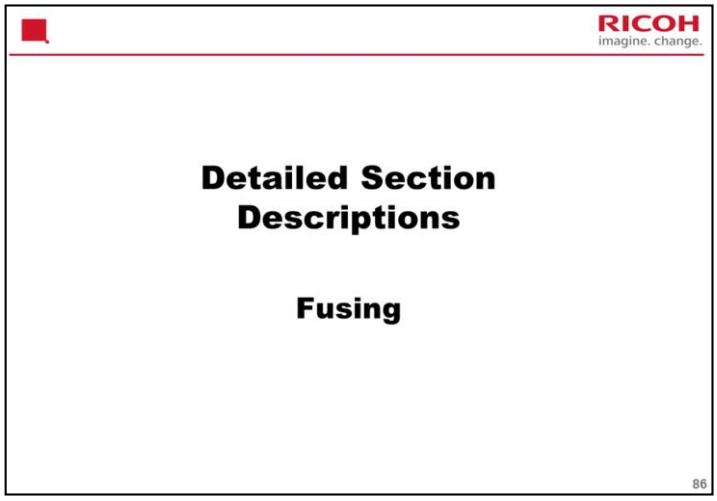
When printing on one side, the paper is fed under the junction gate to the exit/switchback roller, and then delivered.

When printing on both sides, the paper is fed over the junction gate and exit/switchback roller to initiate the switchback operation.

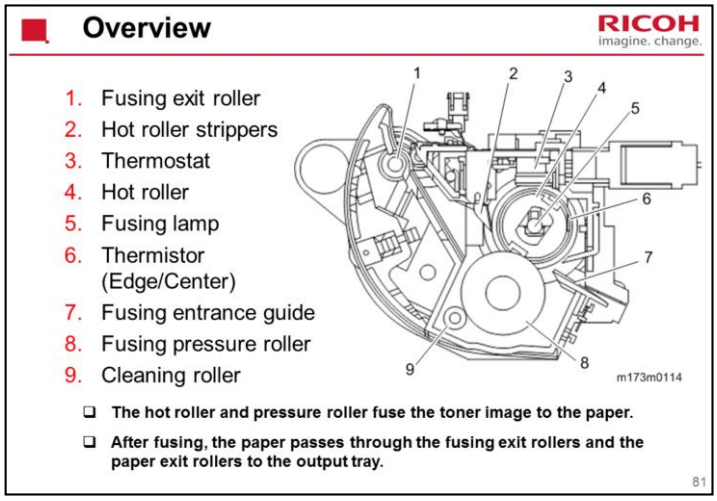
The paper exit guide plate holds down the trailing edge of each sheet of paper after it exits, in order to prevent it from obstructing the following sheets of paper as they exit.



No additional notes

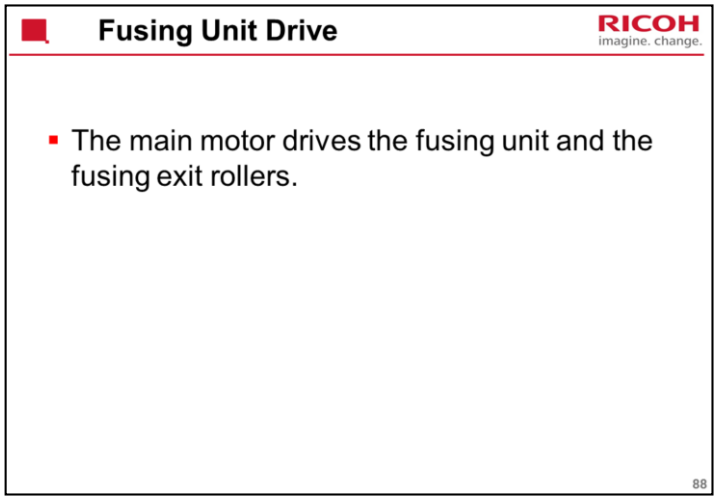


The mechanism is the same as the Sh-P1, but temperature control is based on the Ti-P1 and Rn-P1.
It is basically the same as the GW version of the Gim-MF1/P1, except that the paper guide plate for duplex feed attached to the fusing unit is different.



The thermistor detects the temperature of the hot roller to control lamp on/off timing. (See the "Fusing Temperature control" slide.)

The thermostat provides backup overheat protection.



No additional notes

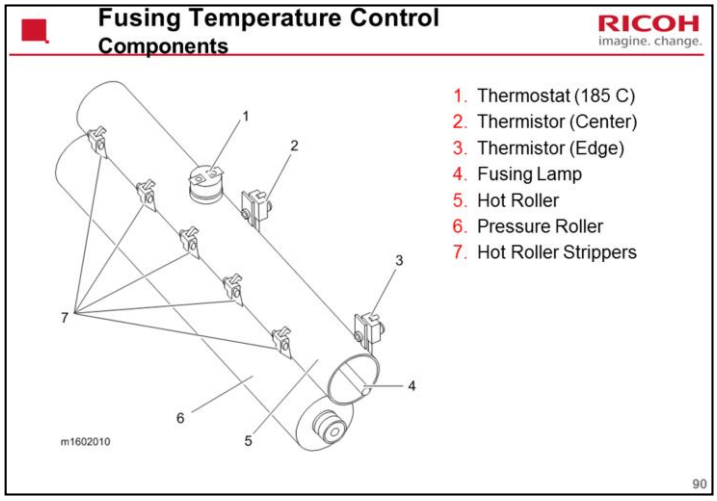
Envelope Lever

RICOH
imagine. change.

- The envelope lever [A] is on the right of the fusing unit.
- Lowering the lever decreases the fusing pressure (to approximately 20% of normal) to reduce wrinkles on envelopes.
- The machine cannot detect the position of this lever, so raise the lever to its original position after printing on envelopes.
- When shipped from the factory, the envelope lever is down, to prevent deformation of the pressure roller.
- Keep the envelope lever lowered when not using the machine for a long period (2 weeks or more).

89

No additional notes



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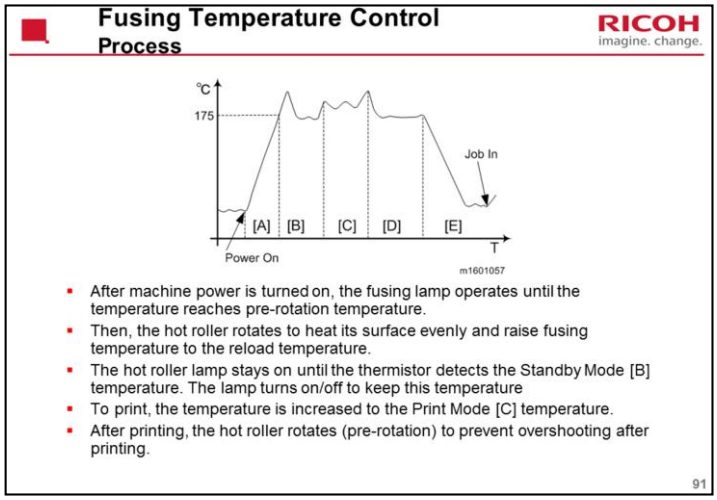


[A]: Warming Up Mode

[B]: Standby Mode

[C]: Print Mode

[D]: Standby Mode

[E]: Auto Off Mode

[F]: Energy Saver Mode

The fusing temperature (Celsius) in each mode is as follows:

Standby Mode: 167

Energy Saver Mode: Ambient temperature

Print Mode

Plain paper 1: 167

Plain paper 2: 174

Middle Thick: 177

Thick 1: 180

Thick 2: 190

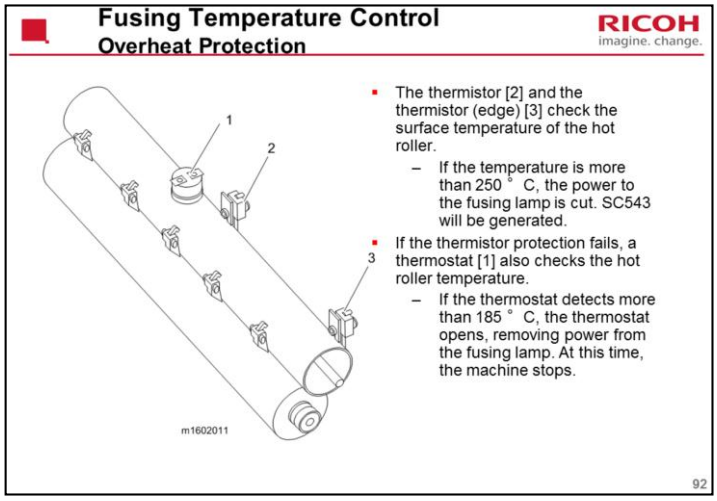
Thin Paper: 160

Envelopes: 205

Post Cards: 190

Recycled Paper: 167

The fusing temperature, except for Energy Saver mode, can be adjusted in SP mode.



No additional notes

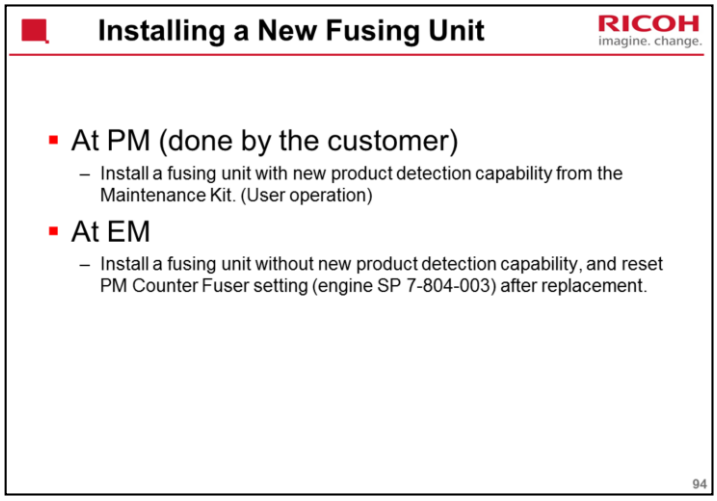
New Unit Detection

RICOH
imagine. change.

- There are two types of fusing unit: one for emergency maintenance (EM) and another for periodical replacement.
- The fusing unit for periodical replacement has a new unit detection mechanism.
- When the machine is switched on after replacing the fusing unit, the engine board detects the fuse [A] under the drawer connector of the new fusing unit, and then blows the fuse.

93

No additional notes



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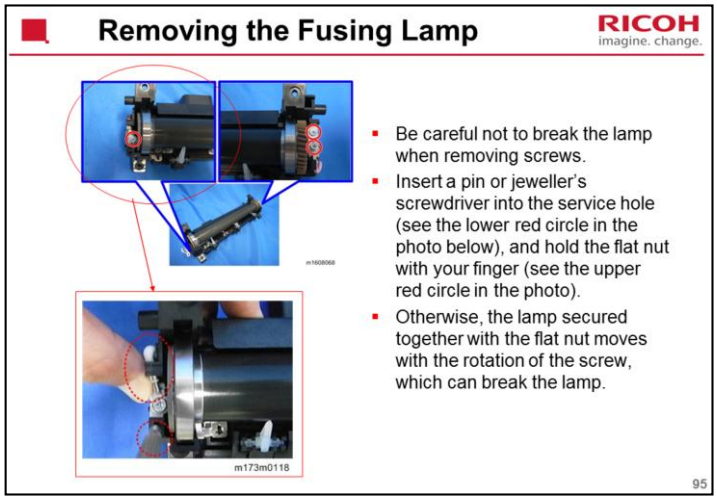
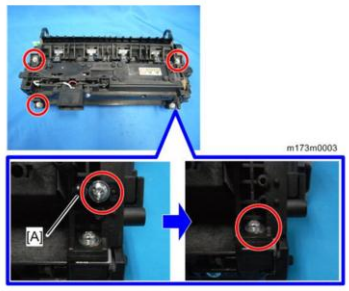


No additional notes

Reassembling the Fusing Unit

RICOH
imagine. change.



- When reassembling, be sure to attach the pin [A] to the correct position. If not, the fusing unit cannot be attached to the main body properly.

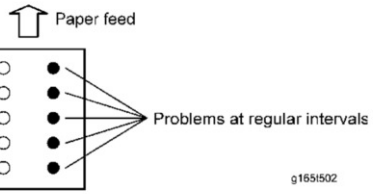
96

No additional notes

No additional notes

Problems at Regular Intervals

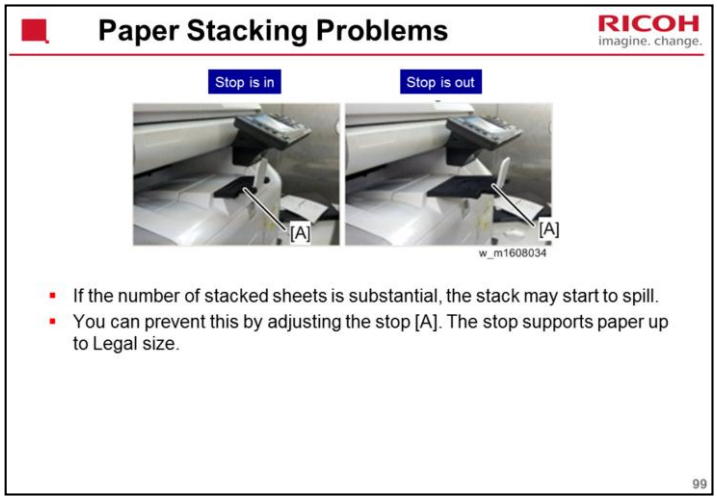
RICOH
imagine. change.



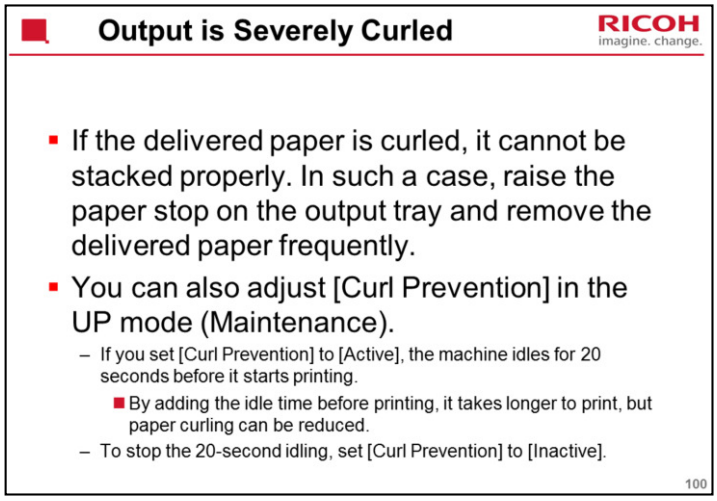
- 29.9 mm: Charge roller
- 37.7 mm: Registration roller
- 45.8 mm: Image transfer roller
- 112 mm: Fusing pressure roller
- 94 mm: Fusing roller
- 100.5 mm: Paper feed roller
- 35.6 mm: Development roller
- 94.4 mm: Drum

98

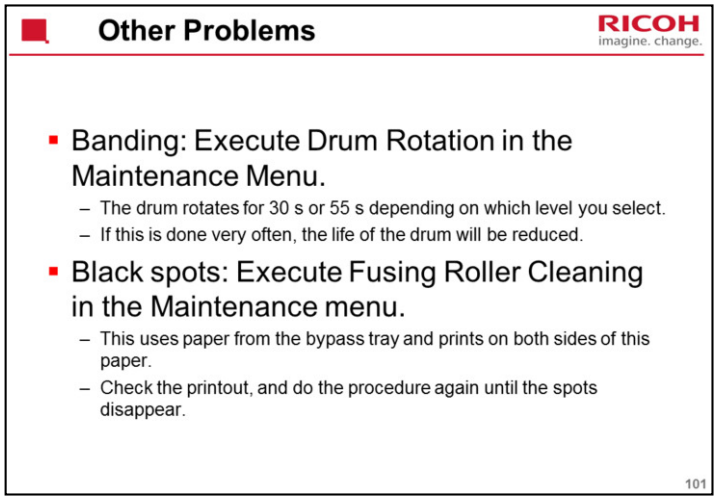
No additional notes



No additional notes

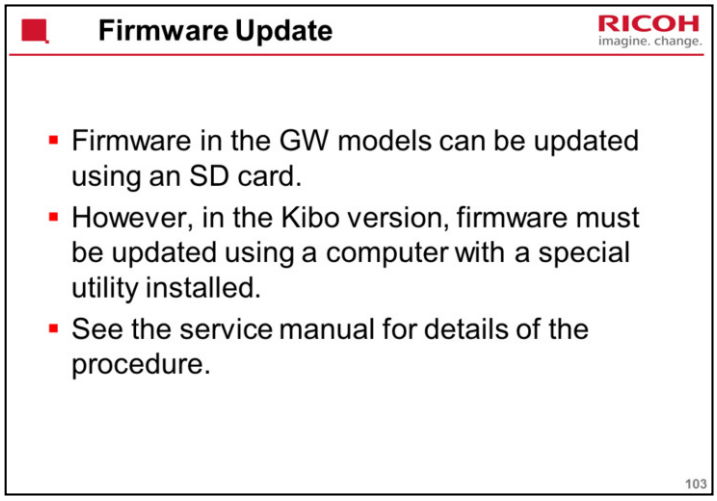


No additional notes



Troubleshooting > When Vertical Banding is Generated, When Black Spots are Generated

No additional notes



No additional notes

The End